



NATIONAL COUNCIL FOR AIR AND STREAM IMPROVEMENT, INC.

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David K. Paylor – Director, Virginia Environmental Quality
Michael G. Dowd – Director, Air and Renewable Energy Division
Virginia Department of Environmental Quality
620 E. Main St.
Richmond, VA 23219

Dear Director Paylor and Director Dowd:

The National Council for Air and Stream Improvement, Inc. (NCASI) appreciates the opportunity to provide comments to the Virginia State Air Pollution Control Board regarding the proposed “Regulation for Emissions Trading” for the CO₂ Budget Trading Program.

NCASI is a non-profit organization that serves forest landowners and the forest products industry as a center of excellence for providing technical information and scientific research needed to achieve their environmental goals and principles. NCASI (<http://www.ncasi.org>) has a history of research investigating forest carbon dynamics and the environmental consequences of utilization of forest biomass for energy production.

We wish to make two points with respect to the proposed legislation as it pertains to biomass energy. First, although biomass energy sometimes results in short-term increases in CO₂ emissions, it has been proven to have long-term benefits, and it is these long-term considerations that are most crucial in mitigating global warming. These long-term benefits should, therefore, be considered when deciding whether or how to regulate biogenic CO₂ emissions from biomass energy. Second, because of its exemption of facilities rather than feedstocks, the legislation could create disincentives for substitution of biomass for fossil fuels, to the detriment of the climate objectives of the legislation.

Warming implications of near-term CO₂ emissions

There is considerable concern about the rate at which global CO₂ emissions are increasing and the implications for global temperatures in both the near-and long-term. This has led to calls for steep near-term reductions in emissions. IPCC indicates that, with respect to emissions of CO₂, it is *cumulative emissions* that will determine peak global temperature. In specific, IPCC notes that;

...serving the forest products industry since 1943

“...taking into account the available information from multiple lines of evidence (observations, models and process understanding), the near linear relationship between cumulative CO₂ emissions and peak global mean temperature is well established in the literature and robust for cumulative total CO₂ emissions up to about 2000 PgC [petagrams of carbon]. It is consistent with the relationship inferred from past cumulative CO₂ emissions and observed warming, is supported by process understanding of the carbon cycle and global energy balance, and emerges as a robust result from the entire hierarchy of models.” (IPCC 2013)

Regarding the timing of emissions that contribute to cumulative emissions, IPCC indicates that;

“A number of papers have found the global warming response to CO₂ emissions to be determined primarily by total cumulative emissions of CO₂, irrespective of the timing of those emissions over a broad range of scenarios.” (IPCC 2013)

One study cited by IPCC states that;

“... the relationship between cumulative emissions and peak warming is remarkably insensitive to the emission pathway (timing of emissions or peak emission rate). Hence policy targets based on limiting cumulative emissions of carbon dioxide are likely to be more robust to scientific uncertainty than emission-rate or concentration targets.” (Allen et al. 2009, p. 1163)

In addition to peak global temperature, there is considerable concern about encountering ecological “tipping points.” It is important to recognize, however, that as global temperature increases toward the eventual peak temperature, these tipping points are going to be encountered. It is only by reducing peak global temperature that such “tipping points” can be avoided. This means that it is only by reducing cumulative CO₂ emissions that tipping points can be avoided.

It is against this scientific backdrop that near-term CO₂ emissions must be judged. Near term increases in CO₂ that allow later reductions in cumulative CO₂ emissions are very different from those that do not. In this context, it is not uncommon for increased use of forest bioenergy to result in near-term increases in atmospheric CO₂, compared to continued use of fossil fuels. In almost all cases, however, as long as land remains in forest, increased use of forest bioenergy to displace fossil fuel accomplishes longer-term reductions in cumulative CO₂ emissions. The time required for increased use of forest bioenergy to transition from net CO₂ emissions to net CO₂ reductions depends on a number of factors. In the case of certain residual materials, the transition is essentially immediate (Gaudreault and Miner 2015). In other cases, this transition requires more time. Nonetheless, considering the materials most likely to be used for energy, increased use of forest bioenergy to displace fossil fuels is likely to result in net benefits to atmospheric CO₂ within a decade or two (Miner et al. 2014). After this transition is completed, the benefits of forest bioenergy continue to accrue.

Even the critics of forest bioenergy acknowledge the long-term benefits of displacing fossil fuel with forest bioenergy. A report prepared on behalf of the National Wildlife Federation and Southern Environmental Law Center, for instance, found that “...using southeastern forests for an expansion of electric power generation produced a significant long term atmospheric benefit, but at short term atmospheric cost” (BERC 2012). In the BERC study, a 35- to 50-year breakeven period was estimated, but this study did not account for reduced deforestation and increased afforestation in the U.S. associated with increased demand for wood, a phenomenon that is well documented in the literature (e.g., see Hardie et al. 2000, Lubowski et al. 2008).

In summary, near-term increases in CO₂ emissions must be judged in the context of whether they are associated with reduced cumulative CO₂ emissions in the longer term. This is because of the insensitivity of global temperature to near-term CO₂ emissions, and the need to reduce cumulative CO₂ emissions to limit peak global temperature. These considerations are directly related to questions about biogenic CO₂ resulting from increased use of forest bioenergy. Increased use of forest bioenergy often results in higher near-term CO₂ emissions compared to continued use of fossil fuel but, as long as land remains in forest, cumulative CO₂ emissions are reduced in the longer term when fossil fuels are displaced by forest bioenergy. This phenomenon clearly needs to be considered when contemplating potential regulation of biogenic CO₂ emissions from biomass energy production.

Exemption of facilities rather than feedstocks

Our second concern with the proposed regulation is its treatment of emissions from biomass energy. There are sound scientific reasons for treating CO₂ emissions from biomass energy production differently from fossil fuel emissions. The two cases in which emission profiles argue for differential treatment of biomass are (1) when the material used for fuel would have ended up being emitted to the atmosphere even if not used for energy production, and (2) when sustainable management of the biomass resource ensures that ongoing growth will remove equivalent quantities of CO₂ from the atmosphere. In the first case, the biomass emissions that would have occurred anyway will prevent fossil fuel emissions associated with producing the same amount of energy. In the second case, a sustainably managed resource grows biomass equal to or exceeding the amount of biomass harvested, ensuring that the resource is not a net source of CO₂ to the atmosphere. In both cases, it is the characteristics of the biomass feedstock, not the characteristics of the power generation process or facility, that support treatment as carbon neutral.

By exempting facilities using 90% or more biomass feedstock (BTU basis), the regulation implicitly acknowledges the environmental and atmospheric benefits of biomass compared to fossil fuels. However, as currently written, it may reduce potential environmental benefits by providing a disincentive for further substitution of biomass for fossil fuels. The regulation takes an “all or nothing” approach to biogenic CO₂ emissions: either all of a facility’s emissions are exempt (if it uses 90% or more biomass fuel) or none of its emissions are exempt. This approach removes any incentive to use environmentally beneficial biomass as part of a fuel mixture in fossil-dominant plants.

A regulatory framework may require documentation to support differential treatment of biomass feedstocks. In the first case, identification of the source of biomass feedstock (e.g., mill residues, black liquor, harvesting by-products, etc.) provides that evidence. In the second case, sustainability metrics derived from inventory of the forest resource provides the documentation. Commonly used metrics include carbon stocks (measured in tons of carbon), or ratio of forest growth to harvests or removals (measured in weight or volume units). Forest inventory data in the US come from plots measured by the US Forest Service Forest Inventory and Analysis (FIA) program. FIA data are collected from portions of the entire US on an annual basis such that complete remeasurement of plots occurs within five to seven years (in the Eastern US; ten years in the West). Thus, statistical evidence of resource change (or stability) usually requires five to ten years of remeasurement data, across specified regions of sufficient size to ensure adequate sample sizes, such as the US South.

As an illustration of the sustainability of the southern US forest resource, Figure 1 shows the carbon stock in trees¹ on timberland across the US South². Carbon stocks have steadily increased from 4.9 billion to 5.6 billion tons from 2005 to 2016, an increase of about 14.5% over a period with an average of 104 million tons of C removed *annually* during harvests. Even if all the biomass harvested from the forest during this time was immediately converted to CO₂ and emitted to the atmosphere (which is far from the actual situation³), the fact that forest carbon stocks continue to increase is proof that biogenic CO₂ from biomass removed from the forest is more than offset by removals of CO₂ from the atmosphere by growing forests. In Virginia alone, tree carbon stocks on timberland rose from 503 million tons in 2005 to 589 million tons in 2016, a net increase of 17% while C removals from harvests were 7.4 million tons annually.

In summary, when biomass from residuals or from sustainably managed forests replaces fossil fuels, there are climate change mitigation benefits. A large body of scientific evidence supports the environmental benefits of biomass energy, regardless of whether the biomass is combusted alone or as part of a biomass-fossil mix.

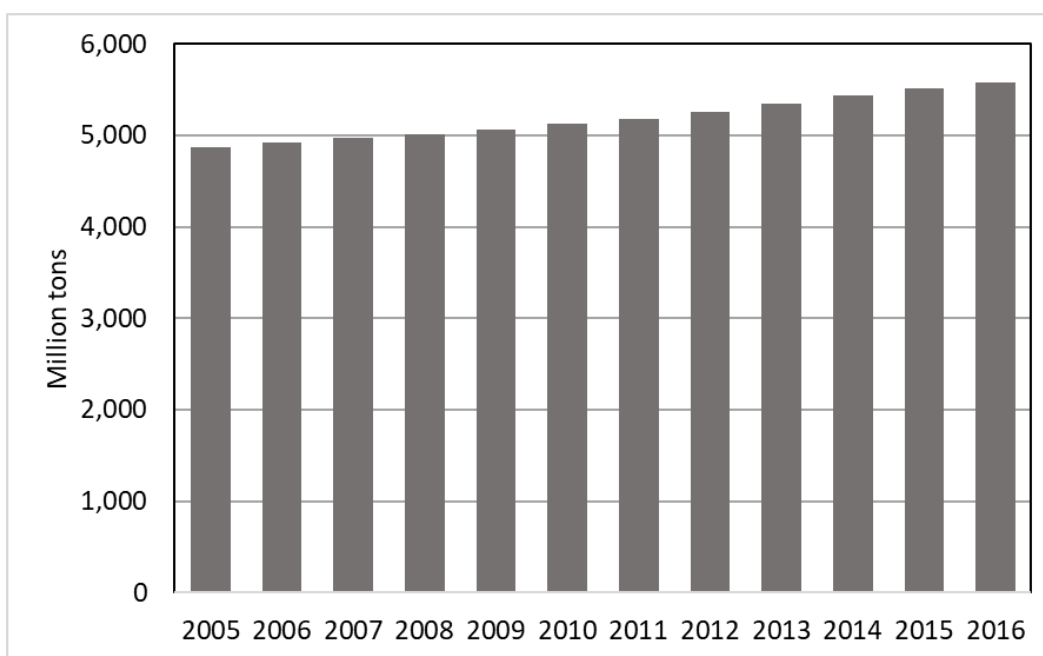


Figure 1. Carbon stock in trees on timberland, US South, 2005 – 2016. Data from Miles, 2018.

¹ Includes live and dead trees, aboveground and belowground carbon.

² Texas and Oklahoma are omitted due to incomplete inventory data across this timeframe. States included are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia.

³ In fact, the U.S.E.P.A. national inventory of Greenhouse Gas Emissions and Sinks indicates that the amount of forest carbon stored in harvested wood products is increasing, indicating that biogenic carbon flows into this pool are greater than biogenic carbon emissions from the pool.

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